Vol. 14 January 1938 No. 1

Bulletin of the Agricultural Chemical Society of Japan.

ABSTRACTS
from
TRANSACTIONS published in JAPANESE

(Pages refer to the Japanese originals of this volume unless otherwise noticed)

Über die Acetylmethylcarbinol- und 2, 3-Butylenglykol-Bildung durch Mikroben. (IV).

Über den Bildungsmechanismus beider Verbindungen.

(ss. 1～6)

Von Yukio TOMIYASU.

(Aus dem Agrikultur-Chem. Inst. der Kaiserlichen Kyushu Univers. Eingeg. am 7, Oct., 1937.)

Die vorbeugende und heilbare Wirksamkeit der Milch und der Milcherzeugnissen für die von überschüssige Zuckernahrung verursachten Hindernisse.

(ss. 7～18)

Von Dr. R. SASAKI u. M. KANDATSU.

(Aus dem Agrikultur-Chem. Inst. der Tokio Kaiserlichen Univers., Tokio. Eingeg. am 27, Sept., 1937.)

In dieser Zeitschrift (Bd. 12, 1936) hat Dr. H. Ariyama angegeben, dass mit einem Futter, das bis zu 60 Proz. des Futters Rohrzucker zusammensetzt und mit alle bekannten Vitaminen ganz genügend sich versorgt, Ratten nicht normalweise erwachsen können und eigenartige Ernährungshindernisse zeigen. Aber für diese Hindernisse wirkt die Trockengährhefe oder seine alkoholische Extraktzugabe von 0.5 g per Tagesdosis nicht nur deutlich vorbeugend sondern auch heilbar.

Die Eigenschaften dieser wirksamen Substanzen sind nach seiner Beschreibungen ziemlich verschieden von den aller bis jetzt anerkannten Vitaminen.

Da von aller Kenntinisse, Milch und Milcherzeugnisse, z. B. diese kondensiert Milch und das Milchpulver, als Kinder aufziehungsmittel mit vieler Rohrzuckerversorgung von grösseren Mengen gebraucht sind, so vermuten wir das Vorhandensein der Wirksamkeit in der Milch, welche für die von überschüssige Zuckernahrung verursachten Hindernisse vorbeugend oder heilbar wirkt, dem Nährwert von Milch in dieser Seite ausschlaggebende Bedeutung zu geben.

Aus solcher Meinungen haben wir einige Experimente aufgestellt, um solche Wirksamkeit, unsere sogenannte „Zucker-schützende Faktoren" in der Rohmilch, kondensierten Milch und Milchpulver, gezuckert oder nicht gezuckert, festzustellen, welcher Methode hauptsächlich nach Ariyamaschen Vorschift folgern.

Unsere erreichte Resultaten sind folgendermassen:

1) Die Rohmilch hat die solche Wirksamkeit, und ihr Wirkungsgrad ist, zu ihrer Trockenmasse berechnet, ungefähr ein von Drittel oder Viertel von Trockengährhefe.

2) In der erhitzten Rohmilch, die bei 96°～98°C für 30 Minuten dauererhitzt wird, ist diese Wisksamkeit ganz oder von grösseren Teil zerstört.

3) Von dem Milchserum, welches von verdünnter Schwefelsäure enteiweisst wird, adsorbiert Säuretonpulver diese Wirksamkeit bei $pH=3.0$ in annährender Vollkommenheit.

4) Die gezuckerte, kondensierte Milch (Zuckergehalt ungefähr 55%) hat diese Wirksamkeit ohne Zersetzen in solchen Grade wie auf ihrem Zuckergehalt sogenannte Ernährungshindernisse vorzubeugen und Ratten normalweise erwachsen zu lassen.

Über die ungezuckerte, kondensierte Milch können wir diese Wirksamkeit nicht feststellen, weil durch ihren zuvielen Wassergehalt Ratten nicht so schnell erwachsen können wie bei Kontrollversuche. Aber nach unseren Beobachtungen bei Durchführung der Versuche verhielt sich diese Milch so wie niedrigere Wirksamkeit als jene erhalten zu sein.

5) Das ungezuckerte Milchpulver hat die Wirksamkeit so viel als gezuckerte, kondensierte Milch.

Über die Ausführung der Versuche und Beobachtungen einiger uns interessierten Erscheinungen von Ratten hoffen wir im Originale zu berücksichtigen.

On Fatty Oils of Smoked Fishes.

(pp. 19～27)

By E. Takahashi and Y. Masuda.

(Agricultural Chemical Laboratory, Hokkaido Imperial University. Received Sept. 20, 1937.)

Fish oils are generally extremely susceptible to oxidative deterioration owing to their unsaturated fatty acid. But it is worthy of notice that the oils of smoked fishes stand long against oxidation, not giving off any fishy odor and maintaining good dietetic value.

Authors, undertaking the research on the nutritive value of fish oils, tried

first some studies on the characteristics of herring body oil and its antioxygenic properties in the process of smoking, the results of which will be summarized below.

1. Acid value, refractive index and iodine value were all increased in the course of smoking. Free fatty acid was increased, too, remarkably.

2. The oils developed strong antioxygenic properties after smoking. Oxygen absorption, peroxide value and Kreis test were inhibited extremely as compared with non-smoked fresh oils.

3. After saponification, the mixed fatty acid of smoked oils had no more antioxygenic properties. Unsaponifiable fraction of the smoked oils which were added to the fresh oils, had no influence on the antioxygenic properties of the latter, showed rather the tendency to urge the oxidation.

4. The oils which were exposed to the smoke directly were found to retard the oxygen absorption like the smoked fish oils. This is probably due to the phenols contained in smoke.

Colloid-chemical Studies on the Soluble Alginate. (I).

On the Viscosity of the Soluble Alginate.

(pp. 28～34)

By Noboru SUZUKI.

(Hakodate College of Fisheries. Received Oct. 4, 1937.)

Few studies have ever been reported of the colloidal behaviour of soluble alginates. This author investigated the effect of various conditions for the preparation of soluble alginates on viscosity.

This report consists of four divisions as follows: —

1. On the influence of kinds and concentrations of alkalies employed for the extractive material.
2. On the influence of preparation process.
3. On the influence of temperature.
4. On the influence of electrolytes.

The Change of Oxidation-reduction Potentials of Water-logged Soils. IV.

Influence of Proteins and Carbohydrates.

(pp. 35～42)

By Kisaburo SHIBUYA, Hideaki SAEKI and Kenhan RYU.
(Laboratory of Soils and Fertilizers, Taihoku Imperial University.
Received Oct. 25, 1937.)

It plays an important rôle on the practice of agriculture that the change of oxidation and reduction potentials of soils is differently influenced by characteristics of organic matters which are applied into the soils as manurial substances. The organic matters, in this occasion, are nitrogenous compounds or proteins and carbohydrates. Burrows and Cordon, recently, studied on the potential change of soils by application of these materials in an upland condition. They recognized, thereupon, the potential of the soils markedly changed toward positive, in accordance with decomposition of proteins, while it moved toward negative by decomposition of carbohydrates. The potential change of soils by application of the same materials under water-logged condition should be, however, different from that in the upland condition.

An investigation on this subject has been carried out by the authors, using three kinds of soils and three kinds of manurial substances., The soil samples are a soil of sandstone and shale origin, a humus loam and a lateritic clay, and the manurial substances are casein and mannite, as the representatives of proteins and carbohydrates, and sulphate of ammonia. The last one has been used, being an inorganic nitrogenous compound, in behalf of comparison to casein. The method of investigation has followed that which was described in previous papers (I—III). Determinations and measurements were continued for ten weeks. In consequence;

(1) The potential of soils added mannite, as already pointed out in the previous papers, rapidly decreases at the early stage of water-logging, gradually rising up, again, in the later period. Whereas the potential of soils added casein almost does not rise up after very marked depression.

(2) The potential depression more greatly occures in soils added casein than in those added mannite.

(3) The potential changes of soils were mixed with both mannite and casein fall, without exception, between two limits which are respectively shown by each. They regularly lean to the characteristic limit according to value of carbon-nitrogen ratio of the organic mixture.

(4) Nature of the potential changes of soils added protein or carbohydrate varies each other between different conditions, upland and water-logged. It depends upon the biological activities whether is aerobic or anaerobic. This is explained by oppression of their activities using a small dose of $HgCl_2$.

(5) Influence by sulphate of ammonia on the potential change of soils is similar to that by casein. However, the potential depression of soils by the former is not so great as by the latter.

In short, the change of oxidation-reduction potentials of soils is differently influenced by addition of protein or of carbohydrates. It is, also, different between upland and water-logged conditions. Sulphate of ammonia influences on the potential change of soils, similarly to the organic nitrogenous matter, casein.

Biochemical Studies of the Locust (IV).

(pp. 43～44)

By Chikafumi ICHIKAWA.

(The Soma Agricultural and Sericultural School. Received Dec. 2, 1937.)

Biochemical Studies on Glutathione. The Third Report.

Glutathione content in Venous Blood of Rabbits.

(pp. 45～48)

By Masayoshi OGAWA.

(Tokyo Municipal Hygienic Institute. Received Oct. 20, 1937.)

The author has already studied arterial and venous blood in rabbits as to the glutathione content, normal or under the influence of ultraviolet irradiation. In the present report, the author compared, in similar condition, the glutathione content in blood samples from (1) auricular vein, (2) jugular vein, (3) hepatic vein, and (4) various parts of the right cardiac auricle in virisectioned rabbits. Method of OKUDA and the author was used.

It was proved that the glutathione content of venous blood was practically constant except in the samples obtained from the right cardiac auricle, which showed slight variations according to the different parts of the right auricle.

Biochemical Studies on Glutathione. The Fourth Report.

Glutathione content in Venous Blood of Rabbits under Latent influence of A-Avitaminotic Diet.

(pp. 49～51)

By Masayoshi OGAWA.

(Tokyo Municipal Hygienic Institute. Recieved Oct. 20, 1937.)

The author determined the glutathione content of rabbits, fed for certain length of time on A-avitaminotic diet. At the time when the avitaminose symptoms were not yet manifest, the total glutathione content of venous blood in these

Glutathione per 100 g blood.

	Before dieting				After dieting for 17 days				15 days after interruption of dieting			
	Avitaminotic group (I)		Controls (II)		Avitaminotic group (I)		Controls (II)		Avitaminotic group (I)		Controls (II)	
GSH	45.64	100	40.00	100	36.96	80.9	34.79	86.9	44.90	98.3	36.97	92.4
GS・SG	10.02	100	13.53	100	22.45	224.0	23.67	174.2	16.87	168.3	16.04	118.5
Total	55.66	100	53.53	100	59.41	106.7	58.46	109.2	61.77	110.9	53.01	99.0

rabbits (I) did not show any deviation from that of control animals, (II) but the reduced glutathione content is decreased in some degree and then oxidized glutathione content is rather increased in these animals (I).

On the Method of Quantitative Estimation of Ascorbic Acid in Tissues.

(pp. 52~64)

By Masayoshi OGAWA.

(Department of Nutrition, College of Medicine, Nippon University. Received Oct. 20, 1937.)

In 1933 Okuda and the author proposed a method for the quantitative estimation of glutathione extracting it from tissues with sulfosalicylic acid solution. Based upon the same principle of our method, Woodward pointed out the superiority of sulfosalicylic acid for indophenol titration of ascorbic acid to trichloracetic acid. Afterward the author found that titration of ascorbic acid with indophenol solution in sulfosalicylic acid gives no reliable results. Sulfosalicylic acid is more effective as a protein-precipitant than meta-phosphoric acid, but the latter is superior to the former as the solvent of ascorbic acid. Accordingly the author found that the mixture of these two acid solutions is the most effective as a protein precipitant besides the autoxidation of ascorbic acid is considerably cut down.

In the present communication, the author proposed a methode for the estimation of ascorbic acid extracting it from tissue with a mixture of sulfosalicylic acid and meta-phosphoric acid, applying the procedure of Birch, Harris and Ray on the acid filtrates.

Principle: — Tissues are freed from proteins by means of a mixture of sulfosalicylic acid and meta-phosphoric acid, and the filtrate from the protein-coagulum is divided into 2 portions. In one portion, the titration method of Birch, Harris and Ray is used and reduced ascorbic acid is determined. In the other portion which was kept under an atmosphere of hydrogen sulphide for about 12 hours, after removing hydrogen sulphid by a stream of inert gas such as CO_2; total ascorbic acid is determined. Reversively oxidized ascorbic acid is calculated from the difference. For the titration of pigmented extract, several method of removing the interfering pigment were tried, but it was found that in each case in which the coloure was removed a part of ascorbic acid was also removed or destroyed. In this report the author described a method using colorimetor for the titration of pigmented extract. By means of this method it has been found possible account 100% of added asscorbic acid.

On the method of quantitative estimation of glutathione in tissues.

(Biochemical Studies on Glutathione. The Fifth Report.)

(pp. 65～72)

By Masayoshi OGAWA.

(Department of Nutrition, College of Medicine, Nippon University.
Received Oct. 20, 1937.)

Okuda and the author (1933) published an iodometric method for the determination of glutathione extracting it from tissue with sulfosalicylic acid. The principle of the method is to titrate in the acid solution in the presence of iodide with a standard iodate solution, and the results of titration are all calculated as glutathione.

Ascorbic acid is a constituent of tissue which reacts with iodine, and therefor is included in the iodate titration value for glutathione.

In the present communication the anthor described a method of estimating glutathione in tissue and in biological fluids according to the fact that in many case glutathione and ascorbic acid like material are the only substances which react with iodine in the iodate titration, and the iodate titration value gives the sum of these two substances quantitatively.

Principle :—Tissues are freed from protein by means of sulfosalicylic acid and the filtrate from the protein coagulum is divided into 2 portions. In one portion iodate value (equivalent of GSH + ascorbic acid) is determined and calculated as GSH (A). And in the other ascorbic acid is determined by means of 2 : 6-Dichlorphenol-Indophenol titration. Multiplying the coefficient 4.1 by ascorbic acid value obteined by 2 : 6-Dichlorphenol-Indophenol, ascorbic acid can be calculated as reduced glutathione (B). GSH :—The quantity of true reduced glutathione is obtained by the difference between the GSH value (A) and (B). GS-SG :—After the reduction of oxidized glutathione into the reduced form by means of zinc dust, total GSH is determined acccording to the above stated procedure. The quantity of oxidized glutathione is obtained by the difference between the total and preexisting GSH.

Inorder to ascertein the accuracy of the present method, the following quantities of reduced glutathione and ascorbic acid were added to water, tomato, and milk respectively, and the determinations were made by means of the method, with the following results :—

	GSH and ascorbic acid content of samples		GSH and ascorbic acid added		Total		GSH equivalent of GSH + ascorbic acid	ascorbic acid value (indophenol)	GSH equivalent of ascorbic acid	GSH found	
mg %	GSH	V.C.	GSH	V.C.	GSH	V.C.				mg %	%
In Water	0	0	17.05	5.44	17.05	5.44	39.01	5.39	22.10	16.90	99.12
In Tomato	14.25	15.30	64.25	17.85	78.50	33.15	212.30	32.75	134.28	78.02	99.38
In Milk	6.30	0.90	20.80	39.40	27.10	40.30	189.00	39.40	161.50	27.50	101.40

From these results it is clear that added glutathione was nearly recovered theoritically.

Die Untersuchungen über die Microorganismen von Zuckerrohrsäfte. II Mitteilung

(ss. 73～85)

von R. NAKAZAWA, Y. TAKEDA und U. SUEMATU.
(The Department of Industry, Government Research Institute, Taiwan.
Zugegangen am 10, Oct. 1937.)

Researches on the Manufacture of Alcohol from the Manchurian starchy Materials (Part IV).

(see the last No. 159)

(pp. 86～92)

By E. YOSHINO and M. OKABAYASHI.
(Central Laboratory, South Manchurian Railway Co., Ltd. Received Oct. 5, 1937.)

Experiment on the Colon Group of Fishes. (VI) (continued)

(pp. 93～114)

By Yutaka YASUKAWA.
(The Department of Food Control of the Government Institute from Infectious Disease,
Head of the Department: Dr. Y. Tohyama. Received June 10, 1937.)
